

I Claim:

1. A disc drive actuation system for precisely positioning a read/write head over a selected track of a rotatable disc, said system comprising:

- A) a flexure,
- B) a slider,
- C) a read/write head firmly attached to said slider,
- D) a first drive unit for pivoting said flexure to position said read/write head approximately over the selected track,
- E) a microactuator comprising:

- 1) an inner inactive region,
- 2) a first outer inactive region,
- 3) a second outer inactive region,
- 4) a first piezoelectric section mounted between said first outer inactive region and said inner inactive region,
- 5) a second piezoelectric section mounted between said second outer inactive region and said inner inactive region,

wherein said inner inactive region is firmly attached to one of said flexure or said slider and both of said outer inactive regions being firmly attached to the other of said flexure or said slider,

- 6) an electrical circuit for energizing said first and said second piezoelectric sections to cause them to expand and contract in order to precisely position said read/write head over said selected track, said circuit and said piezoelectric sections being configured such that said first piezoelectric section expands when said second piezoelectric section contracts and said first piezoelectric section contracts when said second piezoelectric section expands.

2. The actuation system as in Claim 1, wherein said first drive unit comprises a voice coil motor.

3. The actuation system as in Claim 1, wherein said first outer inactive region and said second outer inactive region are connected to said flexure and wherein said slider is connected to said inner inactive region.
4. The actuation system as in Claim 1, wherein said first outer inactive region and said second outer inactive region are connected to said slider and wherein said flexure is connected to said inner inactive region.
5. The actuation system as in Claim 1, further comprising a flex circuit for providing electrical connections to said read/write head and said microactuator.
6. The actuation system as in Claim 1, wherein the disc drive actuation system is a magnetic disc drive actuation system.
7. The actuation system as in Claim 1, wherein the disc drive actuation system is an optical disc drive actuation system.
8. A disc drive actuation system for precisely positioning a read/write head over a selected track of a rotatable disc, said system comprising:
- A) a flexure means,
 - B) a slider means,
 - C) a read/write head means firmly attached to said slider,
 - D) a first drive unit means for pivoting said flexure means to position said read/write head means approximately over the selected track,
 - E) a microactuator means comprising:
 - 1) an inner inactive region,
 - 2) a first outer inactive region,
 - 3) a second outer inactive region,
 - 4) a first piezoelectric section mounted between said first outer inactive region and said inner inactive region,

5) a second piezoelectric section mounted between said second outer inactive region and said inner inactive region,

wherein said inner inactive region is firmly attached to one of said flexure means or said slider means and both of said outer inactive regions being firmly attached to the other of said flexure means or said slider means,

6) an electrical circuit for energizing said first and said second piezoelectric sections to cause them to expand and contract in order to precisely position said read/write head means over said selected track, said circuit means and said piezoelectric sections being configured such that said first piezoelectric section expands when said second piezoelectric section contracts and said first piezoelectric section contracts when said second piezoelectric section expands.

9. The actuation system as in Claim 8, wherein said first drive unit means comprises a voice coil motor.

10. The actuation system as in Claim 8, wherein said first outer inactive region and said second outer inactive region are connected to said flexure means and wherein said slider means is connected to said inner inactive region.

11. The actuation system as in Claim 8, wherein said first outer inactive region and said second outer inactive region are connected to said slider means and wherein said flexure means is connected to said inner inactive region.

12. The actuation system as in Claim 8, further comprising a flex circuit means for providing electrical connections to said read/write head and said microactuator.

13. The actuation system as in Claim 8, wherein the disc drive actuation system is a magnetic disc drive actuation system.

14. The actuation system as in Claim 8, wherein the disc drive actuation system is an optical disc drive actuation system.

15. A disc drive actuation system, comprising:

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- A) a flexure,
 - B) a microactuator connected to said flexure,
 - C) a slider connected to said microactuator, wherein said slider is independently supported by said microactuator, and
 - D) a read/write head connected to said slider,

wherein said microactuator is configured and arranged to displace said read/write head with respect to tracks of a rotatable disc in response to control signals applied to said microactuator, wherein the independent support of said slider by said microactuator allows for precise displacement of said read/write head.

16. The actuation system as in Claim 15, wherein said microactuator comprises at least one piezoelectric section.

17. The actuation system as in Claim 15, wherein said microactuator comprises:

- A) a first active piezoelectric section,
- B) a second active piezoelectric section poled out of phase with said first active piezoelectric section,
- C) two inactive end sections, and
- D) an inactive middle section,

wherein said first active piezoelectric section is sandwiched between one of said two inactive end sections and said inactive middle section, wherein said second active piezoelectric section is sandwiched between the other of said two inactive end sections and said inactive middle section.

18. The actuation system as in Claim 17, wherein each of said two inactive end sections are connected to said flexure and wherein said slider is connected to said inactive middle section.

19. The actuation system as in Claim 17, wherein said inactive middle section is connected to said flexure and wherein said slider is connected to each of said two inactive end sections.

20. The actuation system as in Claim 15, further comprising at least one flex circuit for providing electrical connections to said read/write head and said microactuator.

21. The actuation system as in Claim 15, wherein the disc drive actuation system is a magnetic disc drive actuation system.

22. The actuation system as in Claim 15, wherein the disc drive actuation system is an optical disc drive actuation system.